

**REMARKS**

Claims 134 and 135 are rejected under 35 U.S.C. § 112, second paragraph, as being indefinite for the reasons noted in the official action. Rejected claim 135 is accordingly amended, by the above claim amendments, and the presently pending claims are now believed to particularly point out and distinctly claim the subject matter regarded as the invention, thereby overcoming all of the raised § 112, second paragraph, rejections. The entered claim amendments are directed solely at overcoming the raised indefiniteness rejections and are not directed at distinguishing the present invention from the art of record in this case. If any further amendment to claim 134 or 135 is believed necessary to advance prosecution and place this case in allowable form, the Examiner is courteously solicited to contact the undersigned representative of the Applicant to discuss the same.

Claims 127-133 and 136-197 are rejected, under 35 U.S.C. § 102, as being anticipated in view of Bamdad et al. 6,541,617 (Bamdad '617). The Applicant acknowledges and respectfully traverses the raised anticipatory rejection in view of the following remarks.

Bamdad '617 teaches attaching microparticles to nucleic acid oligomers. At least one electron transfer moiety (ETM) is attached to a respective microparticle. It is taught from the figures of Bamdad '617 that a number of ETMs may be attached to a nucleic acid oligomer via the microparticle. After initiating electron transfer, an electron is transferred from an ETM via the double stranded oligonucleotide to the electrode. Bamdad '617 uses multiple ETMs for an additive signal enhancement, i.e., one ETM transfers one electron to the electrode, two ETMs transfer two electrons to the electrode, n ETMs transfer n electrons to the electrode.

According to the present application upon excitation, an electron is transferred from the donor to the acceptor within the redox-active moiety. Thereafter, the electron is transferred from the acceptor to the double stranded oligonucleotide, and it travels along the double stranded oligonucleotide and it is finally transferred to the electrode. In a method for detecting oligonucleotide hybridization events, thousands of electrons are transferred from one donor/acceptor-complex to the electrode. This is achieved in the present application by the

presence of a suitable free redox-active substance in contact with the nucleic acid oligomer (see original claim 52, presently pending as claim 193).

It is asserted that Bamdad '617 does not teach, suggest or disclose transferring an electron in a first step from an electron-donor to an electron-acceptor. Bamdad '617 also does not provide any teaching, suggestion or disclosure of using a photoinducible redox-active moiety. As explained in detail in the present application, excitation by irradiation with light is a preferred method of transferring an electron from a donor to an acceptor. This is not taught or even suggested by Bamdad '617. Instead Bamdad '617 initiates electron transfer electronically, with voltage being preferred (col. 58, Ins. 24-26).

The Examiner states that Bamdad '617 teaches photoinducibly redox-active moieties in columns 41 to 44, however, after a careful search of Bamdad '617, the Applicant has not been able to locate the teaching that the Examiner is referring. In columns 41 to 44, it is merely mentioned that labels may be detectable optically or fluorescently, however, the term "photoinducibly," as introduced in the present claim 1, does not refer to a method for detection but to the fact that a photoinducibly redox-active moiety exhibits its redox activity only upon irradiation with light. This is mentioned in the paragraph bridging pages 9 and 10 of the present specification.

Photoinducible as used in this application pertains to a certain property which is exhibited only upon irradiation with light of either a specific wavelength or any given wavelength. For example, a photoinducibly redox-active moiety exhibits its redox activity, in other words its property of carrying out a charge separation within the photoinducibly redox-active moiety under certain external conditions, for example, forming the state  $D^+A^-$  and giving up electrons to another suitable oxidizing agent or taking up electrons from another suitable reducing agent, only upon irradiation with light of a specific or any given wavelength. This is not found in the cited references.

In order to emphasize the above noted distinctions between the presently claimed invention and the applied art, independent claim 127 of this application now recites the features

of “[a] modified nucleic acid oligomer comprising a nucleic acid oligomer covalently attached to a single photoinducibly redox-active moiety, wherein the photoinducibly redox-active moiety comprises at least one electron-donor molecule and at least one electron-acceptor molecule, the at least one electron-donor molecule and the at least one electron-acceptor molecule not being joined by a nucleic acid oligomer”. Such features are believed to clearly and patentably distinguish the presently claimed invention from all of the art of record, including the applied art.

Next, claims 134 and 135 are rejected, under 35 U.S.C. § 103(a), as being unpatentable over Bamdad '617 in view of Haberle et al. (Laser in Forschung und Technik Vortaege des Internationalen Kongresses; 12<sup>th</sup>, Munich, June 1995:179-184). The Applicant acknowledges and respectfully traverses the raised obviousness rejection in view of the following remarks.

The Applicant acknowledges that the additional reference of Haberle et al. may arguably related to the features indicated by the Examiner in the official action. Nevertheless, the Applicant respectfully submits that the combination of the base reference with this additional art still fails to in any way teach, suggest or disclose the above distinguishing features of the presently claimed invention currently recited in claim 127, as noted above. As such, all of the raised rejections should be withdrawn at this time in view of the above amendments and remarks.

If any further amendment to this application is believed necessary to advance prosecution and place this case in allowable form, the Examiner is courteously solicited to contact the undersigned representative of the Applicant to discuss the same.

In view of the above amendments and remarks, it is respectfully submitted that all of the raised rejection(s) should be withdrawn at this time. If the Examiner disagrees with the Applicant's view concerning the withdrawal of the outstanding rejection(s) or applicability of the Bamdad '617 and Haberle et al. references, the Applicant respectfully requests the Examiner to indicate the specific passage or passages, or the drawing or drawings, which contain the necessary teaching, suggestion and/or disclosure required by case law. As such teaching, suggestion and/or disclosure is not present in the applied references, the raised rejection

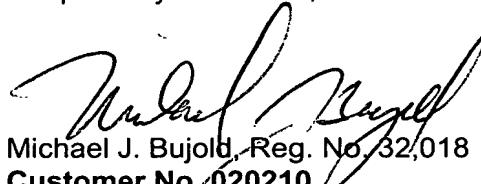
should be withdrawn at this time. Alternatively, if the Examiner is relying on his/her expertise in this field, the Applicant respectfully requests the Examiner to enter an affidavit substantiating the Examiner's position so that suitable contradictory evidence can be entered in this case by the Applicant.

In view of the foregoing, it is respectfully submitted that the raised rejections should be withdrawn and this application is now placed in a condition for allowance. Action to that end, in the form of an early Notice of Allowance, is courteously solicited by the Applicant at this time.

The Applicant respectfully requests that any outstanding objections or requirements, as to the form of this application, be held in abeyance until allowable subject matter is indicated for this case.

In the event that there are any fee deficiencies or additional fees are payable, please charge the same or credit any overpayment to our Deposit Account (Account No. 04-0213).

Respectfully submitted,



Michael J. Bujold, Reg. No. 32,018  
**Customer No. 020210**  
Davis & Bujold, P.L.L.C.  
Fourth Floor  
500 North Commercial Street  
Manchester NH 03101-1151  
Telephone 603-624-9220  
Facsimile 603-624-9229  
E-mail: [patent@davisandbujold.com](mailto:patent@davisandbujold.com)